

# (12) UK Patent Application (19) GB (11) 2 350 584 (13) A

(43) Date of A Publication 06.12.2000

(21) Application No 0005913.9

(22) Date of Filing 10.03.2000

(30) Priority Data

(31) 9905675

(32) 13.03.1999

(33) GB

(71) Applicant(s)

RSG Systems Limited  
(Incorporated in the United Kingdom)  
Unit 2/3 Church Road Business Centre, Church Road,  
Murstons, SITTINGBOURNE, Kent, ME10 3RS,  
United Kingdom

(72) Inventor(s)

Patrick Sumner

(74) Agent and/or Address for Service

Alan Nicol Cohen  
2 Grove Place, Tatsfield, NR WESTERHAM, Kent,  
TN16 2BB, United Kingdom

(51) INT CL<sup>7</sup>

B29C 45/14 39/10 39/12

(52) UK CL (Edition R )

B5A A819 A114P A1R214H A1R314C1F A1R314C6  
A1R413 A1R442 A2B2 A2C A2E12B A2E12C A20T14

(56) Documents Cited

BE 000680590 A US 5783264 A  
WPI Abstract Accession No. 1995-348484 &  
JP 7238257 A (SEKISUI) 12.09.1995 (see abstract)  
WPI Abstract Accession No. 1994-321733 &  
JP 6246792 A (ASAHI) 06.09.1994 (see abstract)  
WPI Abstract Accession No. 1993-364972 &  
JP 5270888 A (NIPPON) 19.10.1993 (see abstract)  
WPI Abstract Accession No. 1992-368575 &  
JP 4266313 A (NIPPON) 24.09.1992 (see abstract)  
WPI Abstract Accession No. 1992-091826 &  
JP 4033812 A (NIHON) 05.02.1992 (see abstract)  
WPI Abstract Accession No. 1987-126956 &  
JP 62070039 A (NIPPON) 31.03.1987 (see abstract)  
WPI Abstract Accession No. 1982-09923J &  
JP 57182373 A (HITACHI) 10.11.1982 (see abstract)  
WPI Abstract Accession No. 1979-76072B &  
JP 54114516 A (SEKISUI) 06.09.1979 (see abstract)

(58) continued overleaf

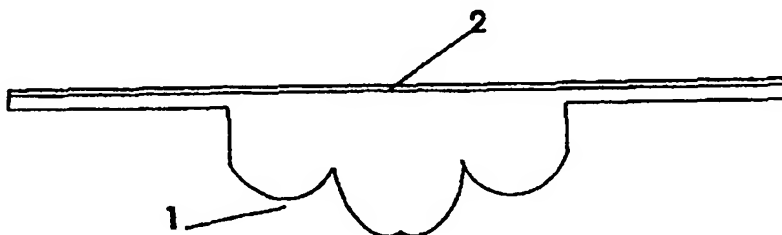
(54) Abstract Title

A decorative glass sheet with adhered polyacrylate resin

(57) A decorative glass sheet 2 has polyacrylate mouldings adhered to its surface, the polyacrylate can be formed in situ by mixing the two components of a two part polyacrylate resin and pumping into a mould 1 to fill the space between the mould 1 and the glass surface. When the resin has hardened the mould is removed to leave a glass sheet 2 with a contoured transparent portion. The polyacrylate has optical properties similar to glass and good temperature stability.

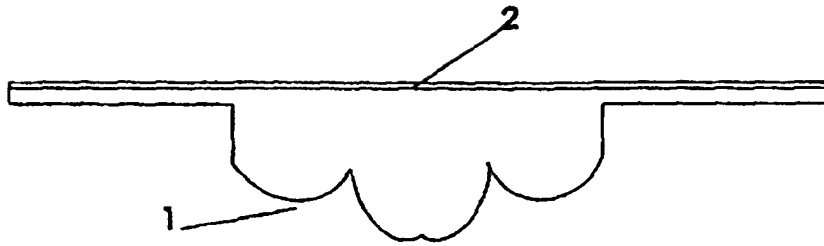
The glass sheet may be coated with an acrylic resin adhesive. Alternatively, instead of the adhesive, a release coating may be applied to the glass sheet.

The mould may be formed by taking a master structure formed of glass, placing a frame around the master and pouring over the master a silicone moulding composition.



GB 2 350 584 A

1/1



## Decorative Glass Sheet

5 The present invention relates to a decorative window, mirror or the like more particularly it relates to a window or mirror having decorative features, preferably transparent, attached to a surface and to a method of forming such a window or mirror.

10 US Patent 5783264 describes a decorative window which consists of a thick transparent plastic resin layer laminated to a sheet of glass. The resin layer can be decorative and can have a finely detailed textured surface. The Patent also describes a method of forming such a structure by forming a silicone mould from a master and placing this mould on a sheet of glass which has been coated with an adherent layer, filling this mould with resin and allowing the resin to set and removing the mould.

15 The adherent layer disclosed is formed of an organosilane and the resin disclosed is a polyester resin which is mixed with a small amount of a peroxide catalyst so that after the mould has been filled with the resin the resin hardens to form a structure; the mould is then removed.

20 It has been found that the structures formed by the methods of this patent can have air bubbles trapped in the resin and the patent describes a method of removing these bubbles by applying a needle attached to evacuation means.

25 Decorative panels, especially when used as outside windows may have to face extreme weather and temperature conditions and it has been found that under a wide variation of temperature the adhesion can fail.

We have devised an improved structure with superior stability, particularly when exposed to range of temperatures.

30 According to the invention there is provided a glass structure which comprises a glass sheet which has adhered to at least part of its surface a solid polyacrylate resin.

The polyacrylate resin is formed in situ by the reaction of a chemically cured resin and suitable resins are made by Kama Kami Paint Co. Japan and sold under the Trade Name Victory Fowl and by Bentley Chemicals sold under the trade name A596. The two components are preferably mixed in substantially equal parts and allowed to cure,  
5 optionally in the presence of a silane promoter.

Preferably the glass is treated with an adhesive layer which is preferably an acrylic resin.

10 The cured resin can be of any thickness, but it has been found that a thickness of resin of substantially the same thickness as the glass gives a pleasing result.

The hardened resin can have any configuration or contour for example it can be bevelled or it can have a smooth curved surface or be textured. In one embodiment of  
15 the invention the hardened resin is in the form of a sheet on which there are raised sections so that there is a large area in contact with the glass.

In another embodiment, bevels or other shaped structures can be stuck to the glass surface separately so that a few moulds can be used to give a wide range of visual  
20 effects.

It has been surprisingly found that such a structure has superior properties and can withstand a temperature range of  $-20^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$  without any loss of adhesion compared to previously used resins.

25 The polyacrylate resins have excellent transparency properties and are glass-like in appearance so that the structure is substantially indistinguishable from a glass structure. Optionally the resin can be coloured by the incorporation of a dye in the resin and the resin can be coloured differently in different parts of the structure  
30 so that a range of visual effects can be obtained.

The combination of optical properties and the superior temperature resistance properties of polyacrylate resins surprisingly gives a product with superior properties compared to the use of other resins.

5 The structure of the present invention can be prepared by forming a mould from a composition which does not adhere to the resin, placing the mould in contact with the glass surface mixing the two components of the polyacrylic resin and pumping the mixture into the mould where it adheres to the glass surface, after the resin cures and hardens the mould is removed and the structure formed.

10

The mould can be formed of any of the conventional compositions which are used for such purposes, for example, a silicone composition of the type described in US Patent 5783264.

15 The mould can be formed from a master which has the appearance of the required finished structure and US Patent 5783264 describes in detail how such moulds can be formed.

20 Preferably the mixture of the components which form the polyacrylate is pumped into the mould under pressure just after the mixture is formed and this has been found to minimise or eliminate the risk of air bubbles being formed and so gives a more satisfactory and glass like appearance. The polyacrylates have been found to have optical properties similar to glass in these conditions which enhances the visual appearance of the structure.

25

In another embodiment of the invention the glass is treated with a release agent for the resin layer so that, after the resin has hardened it does not adhere to the glass, but can be removed from the glass. Alternatively instead of a glass sheet any smooth flat material can be used from which the hardened resin layer can be removed. With a polyacrylate resin, when there is a continuous resin layer over the glass, this layer can be removed as a sheet and this sheet can then be attached to a window, mirror etc. or it can be cut or shaped to fit a particular application. For example it can be attached to the interior of a window to fit exactly within the frame to give a decorative effect,

30

even though the window may be of a non-standard size or shape. When the sheet is stuck to an interior surface, or used indoors, the stresses on the adhesive are much less than outside use so that the resin can be stuck to a window or mirror e.g. by double-sided transparent tape.

5

The invention is described in the accompanying drawing in which a mould (1) which has been formed by taking a master structure formed of glass with the required structure, placing a frame around the master and pouring over the master a silicone moulding composition. When the moulding composition has hardened it is removed from the master. A glass sheet (2) is coated with an acrylic resin adhesive and the mould (1) positioned as shown. The mould is filled by mixing the components of a part chemically cured acrylic resin and polyester resin sold by Bentley Chemicals under the Trade Name A596 and pumping this mixture into the mould so as to fill the space between the mould (1) and the glass sheet (2). When the resin has hardened the mould is removed to leave a glass sheet with a contoured transparent portion.

This structure was tested at a range of temperatures from  $-20^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$  for a period of time and no loss of adhesion or other adverse effects were noted.

20 Alternatively instead of the acrylic adhesive a resin release coating is applied to the glass sheet. The mould is applied and the resin pumped in as above, after hardening of the resin the moulding formed is removed from the glass so that it can be attached to a different surface.

25

30

## Claims

1. A glass structure which comprises a glass sheet which has a solid polyacrylate resin adhered to at least part of its surface.  
5
2. A glass structure as claimed in claim 1 in which the polyacrylate resin is formed in situ by the reaction of a chemically cured resin.
3. A glass structure as claimed in claim 1 in which thickness of the resin is  
10 substantially the same as the thickness of the glass.
4. A glass structure as claimed in claim 1 in which the solid resin is in the form of a sheet on which there are raised sections.
- 15 5. A glass structure as claimed in claim 1 in which a plurality of shaped structures are stuck to the glass surface separately.
6. A glass structure as claimed in any one of the preceding claims in which the polyacrylate resin has optical properties substantially similar to glass.  
20
7. A method of forming a glass structure which comprises a glass sheet which has a solid polyacrylate resin adhered to at least part of its surface the method comprising forming a mould from a composition which does not adhere to the resin, placing the mould in contact with the glass surface mixing the two components of the a two  
25 component polyacrylate resin and pumping the mixture into the mould where it adheres to the glass surface, after the resin cures and hardens removing the mould.
8. A method as claimed in claim 7 in which the glass is treated with an adhesive layer
- 30 9. A method as claimed in claim 8 in which the adhesive layer is an acrylic resin.

10. A method as claimed in any one of claims 6 to 9 in which the mixture of the components which form the polyacrylate resin is pumped into the mould under pressure just after the mixture is formed.





Application No: GB 0005913.9  
Claims searched: 1-10

Examiner: Monty Siddique  
Date of search: 29 September 2000

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK CI (Ed.R): B5A (AB1, AB19, AF35K, AT14P, AT3P)  
Int CI (Ed.7): B29C 39/10 39/12 45/14  
Other: Online: WPI EPODOC JAPIO

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X, Y	BE 680590 A (AMERICAN CYANAMID) see abstract	X: 1 at least Y: 7
Y	US 5783264 (HOWES)	7
X	WPI Abstract Accession No. 1995-348484 & JP 7238267 A (SEKISUI) 12.09.1995 (see abstract)	1 at least
X, Y	WPI Abstract Accession No. 1994-321733 & JP 6246792 A (ASAHI) 06.09.1994 (see abstract)	X: 1 at least Y: 7
X	WPI Abstract Accession No. 1993-364972 & JP 5270868 A (NIPPON) 19.10.1993 (see abstract)	1 at least
X	WPI Abstract Accession No. 1992-368575 & JP 4268313 A (NIPPON) 24.09.1992 (see abstract)	1 at least
X	WPI Abstract Accession No. 1992-091626 & JP 4033812 A (NIHON) 05.02.1992 (see abstract)	1 at least
X	WPI Abstract Accession No. 1987-126956 & JP 62070039 A (NIPPON) 31.03.1987 (see abstract)	1 at least

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.  
& Member of the same patent family

A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.  
E Patent document published on or after, but with priority date earlier than, the filing date of this application.



INVESTOR IN PEOPLE

**Application No:** GB 0005913.9  
**Claims searched:** 1-10

**Examiner:** Monty Siddique  
**Date of search:** 29 September 2000

Category	Identity of document and relevant passage	Relevant to claims
X	WPI Abstract Accession No. 1982-09923J & JP 57182373 a (HITACHI) 10.11.1982 (see abstract)	1 at least
X	WPI Abstract Accession No. 1979-76072B & JP 54114516 A (SEKISUI) 06.09.1979 (see abstract)	1 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

An Executive Agency of the Department of Trade and Industry